

Co-building of socio-technical and organisational innovations in fish farming systems in Cameroon.

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Abstract

Fish farming can be an important source of feed, employment and income for the rural populations of Africa. However, in most cases fish farming does not constitute a full time farming activity, and the fish farming systems put in place by rural populations have not been able to prove their economic profitability. Presently, if sustainable fish farming is to be promoted, it would be a prerequisite to work on the socio-technical and organisational innovations. This hypothesis is being tested within the context of a research programme on the Conception of Innovations and the Role of Partnership, being undertaken by researchers from CIRAD, IRAD and the University of Dschang, Cameroon. The current work consisted in the elaboration of an action-research programme in partnership with producers focusing technical and organisational concerns, in the aim of identifying and facing problematic issues which remain a cause of concern for the various key stakeholders. Paradigms sustaining sociology of translation and sciences suggest that innovations are built on social pillars. It is within the ambit of this theoretical reasoning that we would like to situate the approach developed here. Two groups of producers (Common Initiative Groups) in the west of

Cameroon following "Action-Research" and "Partnership" principles were involved in the process. Work protocols (in the form of written contracts) were jointly defined (researchers and each of the producers' group) and dealt with the construction and management of fish ponds and the supply of fingerlings. The principal methods used were regular meetings aimed at programming activities, resituating the results so far obtained and following up of experimental protocols. This was done together with all the members of the Common Initiative Groups. The main result was the successful formation of the Common Initiative Groups (GIC), where it was possible not only to programme the experimental protocols, but also to agree upon a common working language and representation; these tools are necessary for any socio-technical and organisational innovation. Another result not less important is the role of the written action protocols in the formalisation of the code of ethics necessary for working in partnership. Members modified the representation and together shared the first elements of a localised fish farming model. In this process, strategies of each group of the partnership could be appraised and adjusted accordingly based on sustainability of the fish farming activity, which was put beforehand as the commonly shared target of all. In conclusion we would like to draw the methodological lessons so far derived from this piece of work (ongoing), and particularly on the type of competence which participating researchers need to employ. These researchers are supposed to serve as mediators, facilitators and translators; and also as a mouthpiece of groups which hitherto belonged to varied schools of thought. This needs a big deal of humanism, humility and patience.

Keywords : Innovation, fish farming, code of ethics, sustainability.

Introduction

Despite a number of projects, small scale fish farmers in sub-Saharan Africa has, in general fail to benefit from “green revolution” agricultural innovations disseminated through the training and visit outreach model. Under pressure from World Bank and International Monetary Fund, African governments were obliged to disengage themselves from farmers oversight and assistance. Scarce available resources were henceforth used within the frame of new paradigms, involving more participation of privates (Coche et al., 2004, Chia, 2004). In these less top down approaches, multidisciplinary teams are necessary, to tackle not only biotechnical matter in conventional scientific laboratories, but more complicated on-field items involving socio-ethnological endeavours. To be successful in solving such constraints, researchers have started to test new strategies, including action research (Lui, 1992; Pouomogne, 1995; Lemery et al., 1997; Chia et Barbier, 1999) and partnership research with Farmers (Brummett & Noble, 1995; Prein, 2002; Brummett et al., 2004, Hocdé et al., 2005). In the case of small scale fish farming in Cameroon, public services in charge used to provide assistance to farmers through aquaculture demonstration stations and hatchery production units. Lack of funding resulted in the collapse of these structures, with the emergence of a private led oversight and fingerlings supply by “advanced” farmers. These farmers usually produce fingerlings, mostly Nile tilapia and African catfish in their own farm (Pouomogne et al., 1998). They have also created a team of specialised labourers, which stimulates the construction of new ponds at marginal costs in favour of the demander. These ponds are then stocked using fingerlings supplied at interesting fares from the leading farmer. Unfortunately, technical schemes proposed are poor and hardly integrated into the exploitations. The farmer who is losing money cannot continue the activity and the relatively new ponds are rapidly marginalised; however, most ponds belonging to new innovating farmers have been built in this process, and it would be interesting to better valorise them. With recent interesting results

registered using the alternate approach earlier mentioned, funding institutions were willing to provide some support to CIRAD and IRAD researchers to investigate and improve the situation. Under CIOPS and REPARAC projects, partnership-action research could thus be conducted involving farmers from Menoua division in the Western province in Cameroon. The process of conducting the Partnership action research in fish farming has been somehow described in earlier papers. In Zomba (Malawi) and Yaoundé (Cameroon), the Research Extension Team (RET) model, as promoted by Brummett et al. (2004), uses a research scientist (at 25% of full time) to guide joint learning exercises undertaken by farmers and extension agents working together. At the end of an action-research cycle, all stakeholders (farmers, extension agents, researchers, NGOs) compare and discuss findings, adopt key results to be utilised and decide of burning topics for following research seasons. The authors of this paper reported very high technology adoption rate and better improvement in farm productivity. However, little information was made available dealing with formal tools governing the efficient relations among the miscellaneous groups: How can researchers efficiently communicate with poorly educated farmers, operating within a very complicated environment versus the nearly all-controlled on-station environment? Is the researcher not overlapping the field of extension agents? How can the researchers be efficient on field work and at the same time be successful in producing good scientific papers? Based on the experience currently acquired from Menoua partnership-action research field, some light may be brought to the above listed questions.

Diagnosis survey; action-research implementation

All started with a diagnostic survey of fish farmers of Menoua in 2004. This administrative unit, chosen in reason of the availability of free of charge trainees (graduate students) from Dschang University, is located in Cameroon Western Highlands (above 1100 m mean weight,

fig. 1), 21°C average annual temperature, 1800 mm rainfall spread from March to November. Dominant populations are from Bamileké tribe. The survey used a questionnaire inspired from the Restore surveying guide after Lightfoot et al. (1999). This registered information on household, ponds structure characteristics, fish culture management and integration with other farm components (resource flow diagramming), and every economic item of the whole exploitation Lightfoot et al. (1993). The results of the survey were fed back and validated through PRA workshop with survey household heads; this was described with details by Lybère et al. (2004). Development oriented research themes could thus be identified, and used to design action-research projects. To succeed in building such projects, tight negotiations sessions with committed farmers were needed. A research project consisted of many sub-themes and research activities. Before implementing each operation, an approximate protocol frame, to be adjusted as the on-field routine work would suggest, was designed in consensus with farmers. The adopted protocol was then applied in farmers' ponds using graduate students mainly from Dschang University as research technicians. The follow-up of the protocol used the RET model (Brummett et al., 2004), greatly improved with the governing tools comprising the formal convention (MoU), the steering committee, and the scientific referees council. These are described in further sections of the paper.

Farmers and fishponds features

133 fish farmers were inventoried in Menoua division. They owned 463 ponds averaging 150 m², mostly abandoned (45% only still active). Households head were 50 years old average, literate (90%), nearly all men (94%), married, 54% polygamous, with relatively big households sizes (average 15 members on 5.7 ha plot per family). All were farmers, practicing aquaculture – agriculture integration, which provided for 67% of them the essentials of the household income. $\frac{3}{4}$ were gathered into common initiative groups. As far as pond

management is concerned, two broad types of farm practices could be identified related to the ecologic environment: derivation semi-extensive fish farming in the hill of Fokoué and surroundings (1400 m altitude), and swampy extensive farming in the Santchou valley and surroundings (1100m altitude). 64% of farmers have once benefited technical oversight from Peace Corps Volunteers or from PNVRA, a World Bank Funded Extension project; however, all this oversight has declined over the 5 past years, and no fish farmers were receiving technical support at the time of the survey. Due to miscellaneous hindrances, less than 1/3 of active fish farmers were happy of results so far registered. The following were identified as key problems: In the hills: quality fingerlings and feed shortage (35%), lack of technical oversight (20%), financial support for the exploitation as a whole (36%); in the valley, lack of knowledge to render the management of the natural fish resource a local development tool; this includes taxonomy knowledge of fishes, sustainable strategy to harvest and market the fish, and intensification of the fish farming process. All these problems may start having solution through an action-research project.

Setting-up a memorandum of agreement governing farmers-scientists communication

Key problems identified with producers met the research will from scientist who implemented the diagnosis. The co-building process materialising this will was formalized through a memorandum of agreement (MoU) linking the two parties (Chia et al., 2005). The research multidisciplinary team consisted of 3 scientists from the Cameroon National Agricultural Research Organisation (IRAD, which provided the team leader, a fish feeding specialist with socio-economic bias), from the University (Faculty of Agronomy, Dschang, which provided a lady, fish seed specialist), and an International centre for development oriented Research in agriculture (CIRAD, France, providing an aquaculture expert with sociology background). In the producers' side, all the 133 fish farmers could not be involved in the process; Based on

some objectives criteria (potential commitment capability of respecting the agreement, varieties in ecological milieu), two groups of about twenty farmers each were selected respectively at Fokoue (semi-intensive, hill) and Santchou (extensive, valley). The presence of the research team showing the will of providing technical oversight while respecting local indigenous knowledge facilitated the creation of two formally registered common initiative groups (GIC, in conformity of the law in the freedom of association after MINAT, 1992), namely COPIFOPEM, and PEPISA based at Fokoue and Santchou respectively. The research team initiated a draft of a MoU, which was submitted and discussed with all members of the GICs. The initial proposal of the MoU focused on actual partnership between both teams, while producers' key expectations were to get some subsidies with the facilitation of researchers. Tigh negotiations, through at least six participatory Rural Appraisal (PRA, Chambers, 1992) meeting within above three months time periods, were necessary before reaching an agreement and have the MoU signed by the representative of the three parties, i.e. researchers, Copifopem and Pepisa. The adopted MoU is a two A4 pages document consisting of 7 articles, respectively dealing with: the subject, the funding, the steering and scientific committees, the commitment of farmers, the commitment of researchers, the duration of the MoU, and the settlement of disputes. After 17 months of actual implementation of the action research activities (July 2005 till date), an emphasis needs to be put on the usefulness of this tool in the improvement of communication between researchers and producers. Producers' commitment stating "the search of sustainability rather than requesting over and over again subsidies which act as perfusions", alongside with the one committing the researchers in "being present in farmers' exploitation at least once each two weeks, even via graduate students", and "connecting promising producers to other organisms capable of providing sustainable subsidies or loans" revealed to be the most helpful in the current partnership.

The steering committee

This item of the partnership action research consists of representatives of each team/group: 3 researchers, 6 producers of whom 3 from Copifopem and 3 from Pepisa. The committee normally meets once each three months, and as necessary if pushed by a convincing request from any party. Its role is to insure that commitments from each team are respected, to settle eventual disputes, to plan activities, to evaluate on-going work, and eventually redirect action research objectives according to means availability. Detailed routine activities are mostly discussed during the regular bi-monthly farms visits, and may be evoked at the steering committee only in case of long lasting misunderstanding.

The scientific referee council

With the density of hot matters to be solved facing by producers in their exploitations working in partnership with researchers, the latter can easily be invaded by action works in the detriment of research. The impacts of this shift are indeed more tangible and encouraged by the civil society in comparison of writing scientific papers in high ranking journals. The role of the scientific referee council is to recall the research team towards the achievements of the research project goal and objectively verifiable indicators, and to oversight the improvement of scientific protocols deriving (Chia et al., 2005). The council in current project consisted of 4 recognized senior scientists not involved in the action research; they were from the following domains and Universities: sociologist from Paris Dauphine, biotechnologist from Yaounde 1, vet-breeder from Dschang, and economist from Montpellier. This team meets once a year. The reminder from the referee revealed to be essential in the current project: though a considerable amount of data was gathered through the follow-up of protocols by about 10 graduate students trainees supervised by the members of the research team, no sound scientific paper could be published for the 17 first months of the research program.

Diplomatic but firm query from this council to the research team may push the later to take the necessary time to start writing scientific paper drafts.

The fair attitude of the partnership action researcher/ producer

As in many African countries south of the Sahara, the colonial and post colonial history has stigmatised farmers' behaviours into beggars and bottom of the hierarchy in the modern society. The traditional scheme of extension followed the model of researchers making results available from their on-station activities to extension's agents who direct them to farmers in a vertical up-bottom scheme (fig. 2). When we started discussing with Menoua fish farmers, arriving in villages with our comfortable 4WD light truck, we were welcomed as "patrons" (i.e. boss), and the expatriate of the research team (the French CIRAD colleague) was awaited as "the Whiteman" (viewing in the local people logic, the wiser and richer fellow more capable of providing financial subsidies). A long and patient work of explanations and exchanges on equal bases is necessary not only during the negotiation of the MoU, but throughout and currently while performing the routine action research technical oversight. To be successful in the approach, the researcher has to show out many of the qualities suggested in holy scriptures (e.g. the fruit of the Spirit taught by Paul the apostle in the Holy Bible (Galatians chapter 5, verse 22) : love, joy, patience, goodness, humility, self control, charity, unselfishness. Key words while arguing farmers were "sustainability", explained by researcher as how to make the positive outcomes of the partnership lasting as long as possible following the termination of the action-research project. Good will farmers could thus appraised easily why it was not advisable to depend on financial subsidies, why each of them has to understand by themselves the opportunity a given technical advises provided rather than memorising them as recipes, why research themes would start from what they are already practicing without external help rather than sound scientific data on items unavailable within

their exploitations, etc. Very limited scientific knowledge appeared actually available dealing with the crude and complex farmers' difficulties; it thus needs from the action researchers strong biotechnical background to succeed in adapting available information, and designing sound protocols for new innovative research topic based on the shared appraisal of actual farm sustainable potential fish farming input. Farmers became prouder of their own assets, knowledge and capabilities which were emphasized in the action research partnership process; they were happier to notice that "doctors" (meaning in local view, "scientists" and wealthy fellows) could actually learn from them, formerly marginalised poor people. There were of course some from farmers' team to abuse of the new status of empowerment provided by this new communication environment. In such cases, the victimised scientist had to contextually adapt himself or herself as possible to remain equal with the farmer, i.e. playing the role of nor a victim, nor a persecutor, nor a martyr except in specific cases (Hendricks, 1998).

Main achievements

After a year of routine work with farmers, interesting results were registered in term of improvement in farmers' empowerment at individual levels and organisation at group level and in fish production. The two farmers groups formalised their existence during the setting-up phase of the project. At least a monthly meeting could be held in each group, usually in the absence of researchers, to discuss between others matters related to the action research work on-going. The number of attendants to meetings varied in teeth of the saw during the first half of the year, to stabilise at about 30 members in Copifopem and 10 in Pepisa. Joint purchases of catfish fingerlings could be performed from the first group members' contribution. Progress was less sensitive in group dynamism with Pepisa, whose members showed a more individual "fish hunter" behaviour. In the biotechnical side, farmers of both group acknowledged significant progress: better derivation pond structure and massive adoption of

the 10% water surface compost crib to be loaded with miscellaneous organic refuses from the farm exploitation at Fokoué, shared understanding of catfish taxonomy and production system in flooding ponds in the Santchou valley. With no input from researchers except to the technical oversight provided, average fish production from Copifopem members' ponds increased 2.5 fold, and liquid money cashed by farmers after 6 months production cycle of one of the action-research protocol varied from 20 to 120 US \$, in addition of a greater share distributed to relatives and friends or consumed within the farmer's household; thus apparently insignificant from researchers view, this created excitement within the group, whose members reported in majority to not having registered so good return for all their past harvests.

Major difficulties met; Providing financial support to farmers or not?

These achievements were not without many difficulties, the main been from communication origin. Within farmers group, traditional autocratic power of men vis-à-vis women did not always female members to fully express themselves. In addition of related terms within the MoU dealing with this subject (e.g.: “no intervention during PRA meeting is unnecessary; against, reactions to prior intervention may be ridiculous”), meeting facilitators needed to recall the Universal Human Right Declaration to improve the situation (articles 19 and further of this UN text emphasises on the freedom of expressing oneself without been threatened, and on the fact that men and women while playing different roles are equal in dignity and rights). Unfair communication were also registered within researchers, mainly in the understanding of the process and how to handle miscellaneous hot matters with farmers; to prevent division between farmers sticking to a researcher or another, and thus weakening the action-research targets, regular clarification is needed before and after PRA any meeting gathering the two teams. Another difficulty was linked to the presence of a French citizen in the research team;

he was assimilated in farmers' view as the money provider! Given the past history of farmers' oversight in Cameroon, it appears actually difficult for researchers to collaborate with farmers without facilitating the occurrence of subsidies or loans. This matter was shifted in nearly all PRA workshops with farmers, in spite of the reminder always repeated dealing with the dissuasive articles contained in the MoU. Definitely, if fair communication need to be established in the context of Western Cameroon farmers, technical oversight should not remain the only concern of action researchers; farmers need to be linked to micro-bankers, capable of providing small loans according to the capabilities of each farmer within the group to cope with the reimbursement. Currently with the highly indebted poor countries funding program developed by the World Bank and International Monetary Fund (PPTE/HIPC), focus is needed towards promoting projects dealing with such micro-banking.

To conclude, to successfully build innovations in fish farming at current situation in Western Cameroon, this study suggest to follow some specific steps, and join learning and adopting successful behaviours: (i) make a diagnosis of the practice in the area, and insure a common sharing of outcomes with both farmers and potential action researchers; (ii) develop a formal MoU that may govern future relationships between the teams; taking time to make each side fully committing to the agreement is essential for further successful actions; (iii) a steering committee where the mediator and translator role of the researcher of farmer's problems into sound action research programs is all time evaluated and readjusted should bear the MoU; in addition, a scientific referee council is necessary to recall the researcher towards research goals and publication of sound scientific papers; (iv) Positive attitudes of love, charity, humility and patience are needed from and within each team for a fair and fruitful communication. Committed believers may perform better in this field. It is however essential from the researcher side to possess the best up-to-date technical knowledge dealing with key

problems faced by producers within their actual on-field environment. (v) Credit facilities currently being a real constraint for most small-scale fish farmers, local micro credit agencies should be enlisted as partners, with researchers facilitating the connexion between the micro bankers and the promising farmers.

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